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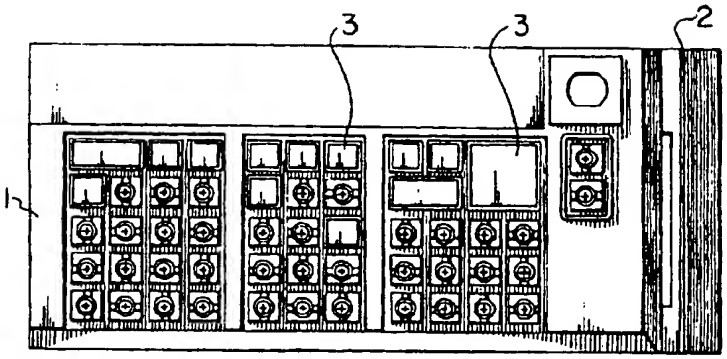
(54) **CASH REGISTER KEYBOARD**



(57) La présente invention vise un clavier utilisé avec une caisse enregistreuse informatisée. Le clavier se compose d'un bâti principal muni, dans sa partie supérieure, d'au moins une rangée d'ouvertures dimensionnées en vue de recevoir une série de queues de touche. Cette série de queues de touche fait saillie au travers de la surface supérieure du bâti principal, chaque queue de touche étant munie d'un taquet d'arrêt l'empêchant de glisser hors de son ouverture. Des dispositifs résilients alignés avec chaque queue de touche permettent de les enfoncer et assurent par la suite leur remontée. Des éléments de circuit sont montés sous la série de queues de touche et

(57) A keyboard for use in association with a computerized cash register system is described. The keyboard comprises a main body portion with at least one array of apertures through the upper surface thereof dimensioned to receive a plurality of keystems. A plurality of keystems extends upwardly from beneath the upper surface of the main body, each keystem including a stop member to prevent it from sliding up through and out its aperture. Resilient means are aligned with each keystem to permit downward actuation thereof and effect subsequent upward return of same. Circuit means are situated beneath the plurality of keystems and have

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assurent le fonctionnement d'une série d'interrupteurs actionnés par l'enfoncement des queues de touche. Des contacteurs électriques sont associés aux dispositifs résilients et aux éléments de circuit pour effectuer le contact et l'enclenchement des interrupteurs. Des éléments logiciels incorporés peuvent être programmés par un utilisateur en vue d'attribuer les fonctions désirées aux divers interrupteurs. Une série de dessus de touches sont fixés aux extremités des queues de touche, à une certaine distance des dispositifs résilients et en saillie des ouvertures ménagées dans la surface supérieure du corps principal, et peuvent être configurés dans l'ordre souhaité par l'utilisateur du clavier qui attribue simplement les fonctions désirées aux différents interrupteurs des éléments de circuit.

arranged thereon a plurality of switches actuatable by downward motion of the keystems. Electrical contact means are associated with the resilient means and the circuit means, for contacting and actuating the switches. Software means are included, programmable by a user for assigning desired functions to the switches. A plurality of keycaps are attachable to the ends of the keystems remote from the resilient means and protruding from the apertures on the upper surface of the main body, whereby said keycaps may be configured in any desired array by a user of the keyboard by assignment of desired functions to the appropriate switches of the circuit means.

The present invention relates to the field of keyboards for computers, and in particular to keyboards for use in computerized cash registers.

Peripheral keyboards for use in association with personal computers or as terminals in a larger computer system have been known for some time. More recently, there has been a trend to utilizing peripheral keyboards in connection with computerized cash registers in retail environments. There have been problems adapting ordinary configured keyboards to a retail environment, because of the fact that a cashier may not be familiar with the keyboard, and may not have sufficient training to utilize the software available to make an ordinary alpha-numeric keyboard function as a cash register keyboard. Moreover, there are many features considered increasing desirable or even essential in point-of-sale keyboards that have not been readily available utilizing PC keyboards. For instance, credit or debit card stripe readers are not a part of a PC keyboard and must therefore be added to same, creating clutter in the physical environment of the sales counter, and adding to the number of pieces of equipment to be mastered by the sales person. As well, these add-ons can become cost-prohibitive. For these reasons, peripheral keyboards dedicated for use as cash register keyboards have been developed.

A common drawback to existing cash register keyboards is that the various keys, be they single keys, double keys, or in some cases quad keys are not configurable by the user of the

keyboard. In many retail environments, one will wish to change the configuration of the keyboard according to the retail environment, and this has heretofore not been possible without the intervention of service personnel. In this regard traditional methods of reconfiguring a keyboard to include a double or quad involve replacement of a number of individual keys with keys that include stabilizers such as internally mounted springs. These are especially required on larger keys to ensure proper actuation and return regardless of where on the keycap surface one strikes the key. Replacement of keys in this manner is time consuming, costly and inefficient, requiring many parts to be inventoried. The combined effect of these factors has been to render dedicated point of sale keyboards for use in connection with PCs substantially beyond the reach of most small businesses. In general, small businesses do not have the financial ability to maintain an effective inventory of necessary parts for existing dedicated point of sale keyboards, and do hot have the trained personnel to perform routine maintenance on such keyboards.

Furthermore, existing keyboards have traditionally employed a metal baseplate onto which keys are mounted, thereby to facilitate the emplacement of keys equipped with stabilizers. However, this does not offer adequate ESD protection.

It is also desired in a retail environment, to provide a keyboard which is able to withstand fairly rough treatment, and is substantially waterproof, as it is not uncommon that liquids

will be spilled at or around a keyboard, or that a person using the keyboard will have wet hands. Moreover, in several particular retail environments, there is constant exposure of the cash register keyboard to other contaminants. For instance, in automotive service centres, the keyboard is routinely exposed to gasoline, oil and sludge. In a lumber store, sawdust will be a problem, and so on.

The object of the present invention is to provide a keyboard for use as a cash register keyboard in a retail environment, the keyboard being readily on-site relegendable. A further object of the present invention is to provide a keyboard that is durable, impact resistant, and water resistant. Yet a further object is to provide a keyboard having multi-dimensional capability in which each key may be assigned a second or third function. A further object of the present invention is to provide a keyboard which emulates a PC keyboard, and is therefore easily adaptable to PC software.

In a broad aspect, the present invention relates to a keyboard for use in association with a computerized cash register system, said keyboard comprising: a main body portion with an upper surface and a lower surface, and at least one array of apertures through the upper surface thereof dimensioned to receive a plurality of keystems; a plurality of

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keystems extending upwardly from beneath said upper surface, each said keystem including an upper end and a lower end, and between said ends a stop member to prevent said keystem from sliding up through and out said aperture; resilient means aligned with each said keystem to permit downward actuation thereof and effect subsequent upward return of same; circuit means situated beneath said plurality of keystems and having arranged thereon a plurality of switches actuatable by downward motion of said keystems; electrical contact means associated with said resilient means and said circuit means, for contacting and actuating said switches; software means programmable by a user for assigning desired functions to said switches; and a plurality of keycaps attachable to the ends of said keystems remote from said resilient means and protruding from said apertures on said upper surface of said main body, whereby said keycaps may be configured in any desired array by a user of said keyboard by assignment of desired functions to the appropriate switches of said circuit means, thereby permitting a said user to selectively change the layout of said keyboard, as desired.

In drawings that illustrate the present invention by way of example:

Figure 1 is a top view of the keyboard of the present invention, with a number of keys removed;

Figure 2A is a top view of a rubber gasket utilized to support the systems of the keyboard of Figure 1;

Figure 2B is a bottom view thereof;

Figure 3 is a schematic of the electrical circuit of the keyboard of Figure 1;

Figure 4 is a detailed view of a keystem utilized in the keyboard of Figure 1;

Figures 5A, 5B and 5C are underside view of single, double and quad keys utilized in the keyboard of the present invention.

Referring now to the drawings, it will be seen that the present invention provides a keyboard housed on an outer shell having upper 1 and lower (not illustrated) shell halves. The upper half includes, in a preferred embodiment, a laterally disposed and angled magnetic stripe reader slot 2. The top most surface of the keyboard includes three arrays of keys 3, being a central 3 X 5 array of keystems flanked by two 4 X 5 arrays of keystems. Other suitable keystem arrays will be obvious to one skilled in the art.

Each keystem array is an integrally molded series of apertures dimensioned to permit insertion of a keystem 4 up from below the surface of the keyboard. The keystems (see Figure 4) each include a cylindrical body 5 slidable in the keystem apertures, and laterally extending base flanges 6 having tabs 7 extending therefrom which fit in slots at the edges of the apertures in the housing, to maintain the vertical alignment of the keystem.

The underside of the upper half of the housing around each array of keystems is a flat surface. After all keystems have been placed in the stem array, a conductive rubber pad 8 (see Figure 2) is placed over the entire arrays aligned by means of alignment pins formed in the casing that mate with corresponding holes 9 in the pad 8, and the switch board (see Figure 3) is screwed onto the upper half of the casing. It will be observed that seals will be formed by the rubber pads around each array, as the switch board presses the rubber pad firmly against the

flat surface of the upper half of the casing around the keystem array.

The rubber pad is provided with an array of dome-like protuberances 10 that project into each keystem aperture on the keyboard. These dome-like protuberances act as resiliently to return each key to its original position after it has been pressed. The inner surface of each protuberance is provided with a small disk 11 of conductive substance, such as carbon particle infiltrated rubber, which, when a key is pressed, will make contact with the two halves of an open circuit on the switch board, to close same.

As can be observed from the illustration of a rubber pad shown in Figures 2A and 2B, the pad is provided on its upwardly facing surface with thinned strain relief bridges 12 at spaced intervals separating two, three or four vertical rows of protuberances. The function of these strain relief bridges is to permit the protuberances to fit accurately into each keystem aperture without having to stretch the pad. That is, manufacturing tolerances for the plastic (eg. ABS) casing upper and the rubber pad at a reasonable cost does not permit one to predict with certainty that there will be a perfect fit between the pad and the casing in every manufactured article. Ordinarily, there will be a slight amount of stretching or misalignment of the pad to obtain a good fit. Without strain relief, the pad would tend to deform along each row of protuberances, thereby altering the shape of the protuberances,

and adversely affecting their resilience. It will be seen that on the underside of the pad, there is a row of strain relief bridges 13 of thinned material formed along each horizontal row of protuberances.

It will be observed from Figure 2 that each array of keystems includes one vertical strain relief, thereby ensuring that in each array, there is no undue side-to-side stretching of the rubber pad.

As can be seen from Figure 1, the keyboard of the present invention may be configured with single, double sized, or quadruple sized keys, depending on the function assigned to the key, and factors such as the frequency that the key will be struck. It will be observed, from Figures 5A, 5B and 5C, that the keys utilized in the keyboard of the present invention are provided with sockets 14 dimensioned to fit the upper end of the keystems after they have been inserting through the keystem apertures in the upper half of the casing. These sockets may be cruciform 14a in shape, to engage the cruciform upper end of a keystem, or they may be round 14b, as is the case in the diagonally opposed sockets of the quad key of Figure 5C, for ease of removal of the key. The keys are fully removable by the users, merely by being pulled upwardly away from the keystems. If it is desired to change the function of any particular key, or move the key, it is merely depressed (or moved to its new position and depressed) and an appropriate code entered via the PC in the central key array, which is a numeric keypad. The

internal software of the keyboard supplied via PC then designates the new function to the switches contacted by the depressed key. It is not necessary to physically alter the switching board. In particular, it is not necessary to physically de-activate any of the switches contacted by the quad or double key. That is, since only one switch is required to signal any given function, it has heretofore been required, in reconfiguration of a keyboard, to physically disconnect three of the four (or one of two)switches struck by the quad or double key. However, by utilizing software to configure the keyboard, this is done internally.

With regard to the problem of keys, especially large (e.g. quad) keys sticking, this problem has been solved by the applicant in two ways. As discussed above, the unitary rubber pad provided beneath the keystem is dimensioned to provide a protuberance beneath each keystem. The strain relief bridging in the pad is provided to ensure that the protuberances are not deformed so that they lose resilience. The second way to ensure that sticking does not occur is to provide a keystem aperture that permits a minimum of loose play of the keystem within same, but not so much that the keystem will stick in the aperture . That is, it will be understood that in a quad key, four keystems will be under the key, each stem being movable in its own aperture. The diagonally opposite keystems, being the furthest apart, are most likely to cause binding of the key. This has been found to occur most frequently if the stems are a close fit in their apertures. When a quad key is struck near a corner, there will be a force acting straight down on the stem in that

corner, but angularly on the other, three stems, and that force will act at a fairly large angle on the stem opposite. If that stem is permitted to wobble in its aperture so that when it slides down it does not strike the centre of the protuberance beneath it, it will tend to bind on its return because the protuberance will not be pushing resiliently on it and because the lower edge of the aperture will be pressing on the stem. By providing close fit between the stems and the aperture, the applicant has assured that angular forces acting on the keystem will be absorbed by the keystem sliding in its aperture and the keystem will strike the centre of its aligned protuberance and return normally.

With regard to other aspects of the keyboard of this invention, there will be obvious to one skilled in the art, since any number of desired features may be combined in any single unit.

It is to be understood that the examples described above are not meant to limit the scope of the present invention. It is expected that numerous variants will be obvious to the person skilled in computer keyboard design, without any departure from the spirit of the present invention. The appended claims, properly construed, form the only limitation upon the scope of the present invention.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A keyboard for use in association with a computerized cash register system, said keyboard comprising:

(a) a main body portion with an upper surface and a lower surface, and at least one array of apertures through the upper surface thereof dimensioned to receive a plurality of keystems;

(b) a plurality of keystems extending upwardly from beneath said upper surface, each said keystem including an upper end and a lower end, and between said ends a stop member to prevent said keystem from sliding up through and out said aperture;

(c) resilient means aligned with each said keystem to permit downward actuation thereof and effect subsequent upward return of same;

(d) circuit means situated beneath said plurality of keystems and having arranged thereon a plurality of switches actuatable by downward motion of said keystems;

(e) electrical contact means associated with said resilient means and said circuit means, for contacting and actuating said switches;

(f) software means programmable by a user for assigning desired functions to said switches; and

(g) a plurality of keycaps attachable to the ends of said keystems remote from said resilient means and protruding from said apertures on said upper surface of said main body, whereby said keycaps may be configured in any desired array by a user of said keyboard by assignment of desired functions to the appropriate switches of said circuit means, thereby permitting a said user to selectively change the layout of said keyboard, as desired.

2. A keyboard as claimed in Claim 1, wherein said resilient means comprises at least one sheet of resiliently deformable material having an interior surface and an exterior surface having formed therein a plurality of dome-like protuberances, there being a said protuberance extending upwardly into each said keystem aperture and resiliently contacting the lower end of each said keystem.

3. A keyboard as claimed in Claim 2, wherein said contact means comprises an electrically conductive contact on the

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interior surface of each said dome-like protuberance, whereby downward actuation of a said keystem brings said electrically conductive contact into contact with a switch on said circuit means, to bridge an open circuit of said switch and actuate same.

4. A keyboard as claimed in Claim 3, wherein said sheet of deformable material is adapted to align said protuberance with said keystem aperture in instances of improper fit between said sheet and said main body.

5. A keyboard as claimed in Claim 4, wherein said sheet is provided with thinned strain relief bridges along its length on either or both surfaced thereof to permit slight stretching and realignment of said sheet whereby said protuberances will fit into said apertures, thereby limiting dimensional error in the components of said keyboard and preventing binding of a keystem on its return stroke.

6. A keyboard as claimed in Claim 5, wherein a moisture resistant seal is formed between said circuit means and said main body, by the sandwiching of said sheet of deformable material between same.

7. A keyboard as claimed in Claim 6, wherein said sheet of deformable material is made of silicone rubber.

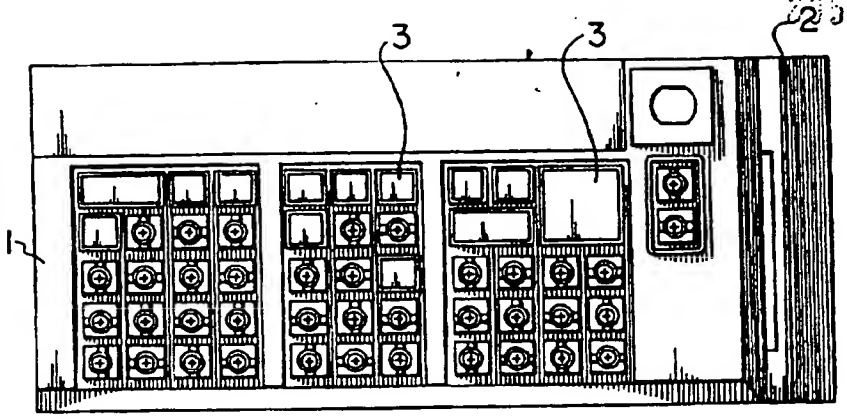

FIG. 1

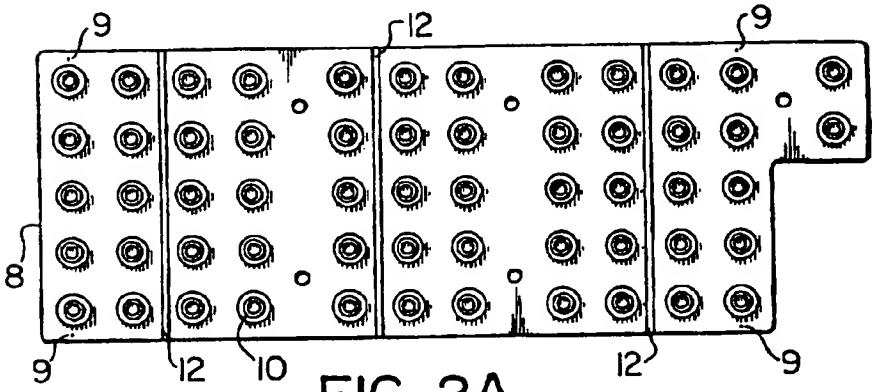

FIG. 2A

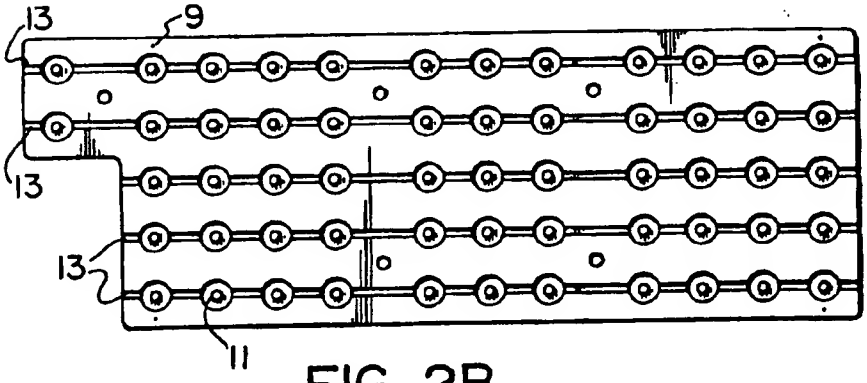

FIG. 2B

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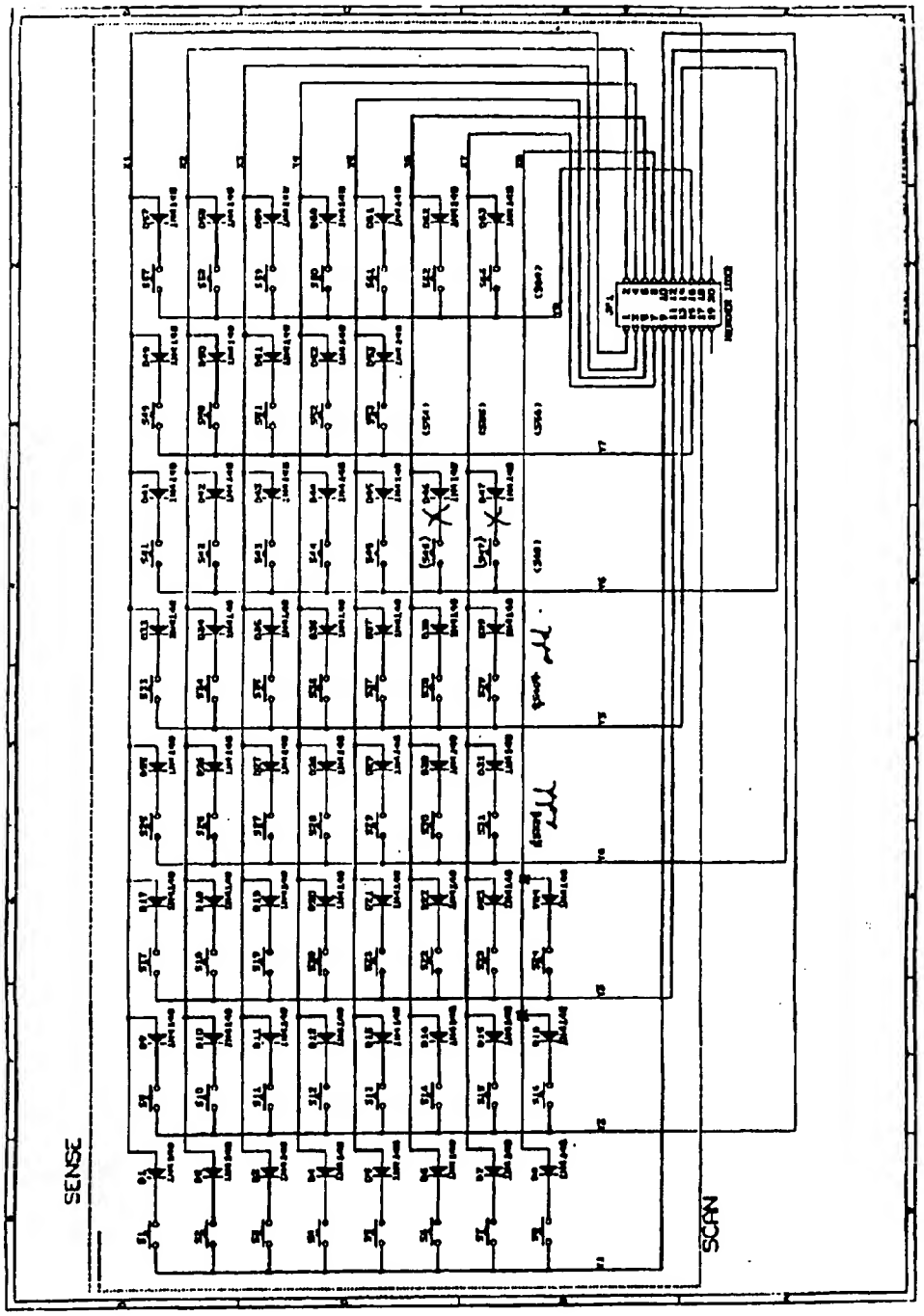

FIG. 3

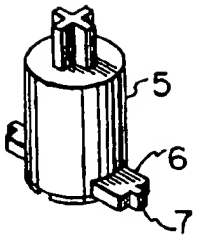

FIG. 4

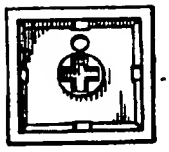

FIG. 5A

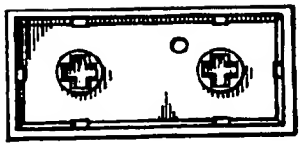

FIG. 5B

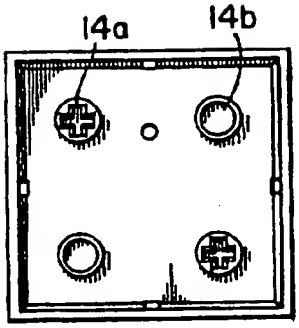

FIG. 5C